

Amendments to Claims

1. (Currently Amended) A process for producing a polymer comprising:
conveying hybrid reactor mixtures comprising one or more hybrid reactor monomers and one or more hybrid reactor initiators to one or more hybrid reactors maintained at effective hybrid polymerization temperatures and sub-reflux polymerization gage pressures to cause polymerization of a portion of said hybrid reactor monomers into said polymer; and
conveying hybrid reactor contents to one or more batch reactors maintained at effective batch polymerization temperatures and reflux polymerization gage pressures to cause polymerization of a remaining portion of said hybrid reactor monomers into said polymer.
2. (Original) The process of claim 1 wherein said hybrid reactor mixture comprises a polymerization medium.
3. (Original) The process of claim 2 wherein said polymerization medium comprises one or more organic solvents, an aqueous medium, or a polymeric component.
4. (Original) The process of claim 3 wherein said organic solvent is selected from the group consisting of acetone, methyl amyl ketone, methyl ethyl ketone, an aromatic solvent blend, xylene, toluene, ethyl acetate, n-butyl acetate, t-butyl acetate, butanol, glycol ether, and combination thereof.
5. (Currently Amended) The process of claim 3 wherein said aqueous medium comprises water, or an aqueous solution of water and a water miscible solvent.
6. (Original) The process of claim 3 wherein said polymeric component comprises a polyester, acrylic polymer, or a mixture thereof solvated or dispersed in one or more said organic solvents or said aqueous medium.
7. (Original) The process of claim 1 further comprising conveying a polymerization medium to said hybrid reactors before said hybrid reactor mixtures are conveyed to said hybrid reactors.
8. (Original) The process of claim 1 wherein an excess portion of said hybrid reactor contents is conveyed to said batch reactors once said hybrid reactors are filled to preset levels.
9. (Original) The process of claim 1 wherein said hybrid reactors are stirred tank reactors.
10. (Original) The process of claim 1 wherein said hybrid polymerization temperatures range from 80°C to 400°C.

11. (Previously Presented) The process of claim 1 wherein said sub-reflux polymerization gage pressures in said hybrid reactors range from 0 to 2.76 MPa (0 to 400 psig).

12. (Original) The process of claim 1 wherein said portion of said monomers polymerized in said hybrid reactors ranges from 30 weight percent to 99 weight percent, all based on the total amount of monomers conveyed to said hybrid reactors.

13. (Original) The process of claim 1 comprising conveying inert gas in vapor space in said hybrid reactors.

14. (Original) The process of claim 13 wherein said inert gas is nitrogen, argon, carbon dioxide or a mixture thereof.

15. (Original) The process of claim 1 wherein batch reactor contents comprise a polymerization medium.

16. (Original) The process of claim 15 wherein said polymerization medium comprises one or more organic solvents, or an aqueous medium.

17. (Original) The process of claim 1 further comprising conveying one or more said initiators to said batch reactors.

18. (Original) The process of claim 1 or 17 further comprising conveying one or more said monomers to said batch reactors.

19. (Original) The process of claim 1 further comprising conveying a polymerization medium to said batch reactors before said hybrid reactor contents are conveyed to said batch reactors.

20. (Original) The process of claim 1 wherein said batch reactors are stirred tank reactors.

21. (Original) The process of claim 1 wherein said batch polymerization temperatures range from 80°C to 300°C.

22. (Previously Presented) The process of claim 1 wherein said reflux polymerization pressures in said batch reactors are at an atmospheric pressure.

23. (Original) The process of claim 1 comprising conveying inert gas in vapor space in said batch reactors.

24. (Original) The process of claim 1 wherein a solution of said hybrid reactor initiators in a polymerization medium is conveyed to said hybrid reactors.

25. (Original) The process of claim 1 wherein said hybrid reactor monomers are selected from the group consisting of (meth)acrylate monomers, functional (meth)acrylic

monomers, acid monomers, nitrile monomers, styrene, styrenic monomers, amide monomers, silyl monomers, vinyl monomers, and a combination thereof.

26. (Original) The process of claim 1 wherein said initiators comprise redox initiators, thermal initiators, photochemical initiators, or a combination thereof.

27. (Original) The process of claim 1 further comprising conveying a portion or all of said hybrid reactors contents to said batch reactors when preset unsafe hybrid reactor pressures are reached.

28. (Original) The process of claim 2 further comprising rinsing said hybrid reactors with a chaser portion of the polymerization medium after all of the hybrid reactor contents had been conveyed to batch reactors; and

conveying said chaser portion to said batch reactors.

29. (Original) The process of claim 1 wherein said polymer is an acrylic polymer, a blend of an acrylic polymer and polyester, microgel, homopolymer, copolymer, block copolymer, graft copolymer, comb copolymer, branched copolymer, branch-upon-branch copolymer, non-aqueous polymer dispersion, star polymer, oligomer, and a ladder copolymer.

30. (Canceled)

31. (Canceled)

32. (Currently Amended) A process for producing a polymer comprising:
conveying a hybrid reactor mixture comprising one or more hybrid reactor monomers and one or more hybrid reactor initiators to a hybrid reactor maintained at an effective hybrid polymerization temperature and sub-reflux polymerization gage pressure to cause polymerization of substantial amount of said hybrid reactor monomers into said polymer; and
conveying hybrid reactor contents to a batch reactor maintained at an effective batch polymerization temperature and reflux polymerization gage pressure to cause polymerization of remaining amount of said hybrid reactor monomers into said polymer.

33. (Currently Amended) A process for producing a graft copolymer comprising:
conveying hybrid reactor mixtures comprising one or more hybrid reactor monomers and one or more hybrid reactor initiators to one or more hybrid reactors maintained at effective hybrid polymerization temperatures and sub-reflux polymerization gage pressures to cause polymerization of said hybrid monomers into macromonomers;
conveying hybrid reactor contents to one or more batch reactors maintained at effective batch polymerization temperatures and reflux polymerization gage pressures; and

conveying batch reactor mixtures comprising one or more batch reactor monomers and one or more batch reactor initiators to cause polymerization of said batch reactor monomers into a backbone of said graft copolymer having said macromonomers grafted onto said backbones.

34. (Original) The process of claim 33 comprising conveying one or more chain transfer catalysts to provide said macromonomers with an unsaturated terminal group.

35. (Original) The process of claim 34 wherein said chain transfer catalyst is diaquabis(borondifluorodimethylglyoximate)cobaltate(II), diaquabis(borondifluorodiphenylglyoximate)cobaltate (II), pentacyanocobaltate (II), or a combination thereof.

36. (Original) The process of claim 33 wherein said hybrid reactor contents and said batch reactor mixtures are conveyed simultaneously to said batch reactors or said hybrid reactor contents are conveyed to said batch reactors after said conveying of a portion or all of said batch reactor monomers to said batch reactors.

37. (Original) The process of claim 36 wherein a portion or all of said batch reactor initiators is conveyed simultaneously with said batch reactor monomers or with said hybrid reactor contents to said batch reactors.

38. (Original) The process of claim 36 further comprising conveying a polymerization medium to said hybrid reactors, said batch reactors; or to said hybrid and batch reactors before conveying said hybrid reaction mixtures to said hybrid reactors.

39. (Original) The process of claim 36 further comprising conveying a polymerization medium to said hybrid reactors before conveying said hybrid reaction mixtures to said hybrid reactors.

40. (Original) The process of claim 36 further comprising conveying a polymerization medium to said batch reactors before conveying said hybrid reactor contents to said batch reactors.

41. (Original) The process of claim 36 further comprising conveying a polymerization medium to said batch reactors before conveying said batch reactor mixtures to said batch reactors.

42. (Original) The process of claim 36 further comprising conveying a polymerization medium to said batch reactors before conveying said batch reactor mixtures and said hybrid reactors contents to said batch reactors.

43. (Original) The process claim 36, 37, 38, 39, 40, 41 or 42 wherein a solution of said hybrid reactor initiators in a portion of said polymerization medium is conveyed to said hybrid reactors.

44. (Original) The process claim 36, 37, 38, 39, 40, 41 or 42 wherein a solution of said batch reactor initiators in a portion of said polymerization medium is conveyed to said batch reactors.

45. (Original) The process claim 36, 37, 38, 39, 40, 41 or 42 wherein a solution of said hybrid reactor initiators in a portion of said polymerization medium is conveyed to said hybrid reactors; and a solution of said batch reactor initiators in another portion of said polymerization medium is conveyed to said batch reactors.

46. (Original) A process for producing a polymer blend comprising:
conveying hybrid reactor mixtures comprising one or more hybrid reactor monomers and one or more hybrid reactor initiators to one or more hybrid reactors maintained at effective hybrid polymerization temperatures and sub-reflux polymerization gage pressures to cause polymerization of said hybrid monomers into a hybrid reactor polymer;

conveying hybrid reactor contents to one or more batch reactors maintained at effective batch polymerization temperatures and reflux pressures; and

conveying batch reactor mixtures comprising one or more batch reactor monomers and one or more batch reactor initiators to cause polymerization of said batch reactor monomers into a reactor polymer to form said polymer blend.

47 – 64. (Canceled)